NAVEDTRA 43245-C
Naval Education and Training Command
April 1995
0501-LP-481-9800

PERSONNEL QUALIFICATION STANDARD

FOR

NAVY DIVER

NAME (Rate / Rank) _____

Although the words “he,” “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this material.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT'D)

Page

ACKNOWLEDGEMENTS

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INTRODUCTION

PQS PROGRAM

PQS is a system for qualifying officers and enlisted personnel to perform certain duties. It is a compilation of the knowledge and skills required to qualify for specific watchstations/ workstations, maintain specific equipment or perform as a team member within your unit. The PQS Program is not designed as a training program, but provides many training objectives. This PQS has been written by fleet personnel who are currently performing in the watchstations/workstations covered in this package and with many years of experience. They have determined that these are the minimum requirements for safely and effectively performing at these watchstations/workstations.

CANCELLATION

This Standard cancels and supersedes NAVEDTRA 43245-B.

APPLICABILITY

This PQS is applicable to all Naval ships.

TAILORING

To command tailor this package, first have it reviewed by one or more of your most qualified individuals. Delete any portions covering systems and equipment not installed on your ship, aircraft or unit. Next, add any line items, fundamentals, systems and watchstations/ workstations that are unique to your command but not already covered in this package. Finally, the package should be reviewed by the cognizant department head and required changes approved by the Commanding Officer or his designated representative. Retain the approved master copy on file for use in tailoring individual packages.

QUALIFIER

The PQS Qualifier is designated in writing by the Commanding Officer to sign off individual PQS line items. Qualifiers will normally be E-5 or above and, as a minimum, must have completed the PQS they are authorized to sign off. The names of designated Qualifiers should be made known to all members of the unit or department. The means of maintaining this listing is at the discretion of individual commands. For more information on the duties and responsibilities of PQS Qualifiers, see the PQS Management Guide.

CONTENTS

This PQS is divided into three sections. The 100 Section (Fundamentals) contains the fundamental knowledge or book learning necessary for satisfactory understanding of the watchstation/workstation duties. The 200 Section (Systems) is designed to acquaint you with the systems you will be required to operate at your watchstation/workstation. The 300 Section (Watchstations) lists the tasks you will be required to satisfactorily perform in order to achieve final PQS qualification for a particular watchstation/workstation. Detailed explanations are provided at the front of each section.

REFERENCES

The references used during the writing of this PQS package were the latest available to the workshop at the time. However, the most current references available should be used when qualifying with this Standard.

TRAINEE

Your supervisor will tell you which watchstations/workstations you are to complete and in what order. Before getting started, turn to the 300 Section first and find your watchstation/ workstation. This will tell you what you should do before starting your watchstation/ workstation tasks. You may be required to complete another PQS, a school, or other watchstations/workstations within this package. It will also tell you which fundamentals and systems from this package you must complete prior to qualification at your watchstation/ workstation. If you have any questions or are unable to locate references, contact your supervisor or qualifier. Good Luck!

PQS FEEDBACK REPORTS

This PQS was developed using information currently available at the time of writing. When equipment and requirements change, the PQS needs to be revised. The only way the PQS Development Group knows of these changes is by you, the user, telling us either in a letter or via the Feedback Report contained in the back of this book. You can tell us of new systems and requirements, or of errors you find.

DEFINITIONS OF WORDS USED IN PQS

AIRCREW EVOLUTION : A grouping of aircrew tasks that measure performance in the course of a flight

COMPONENTS : Major units that make up a system when properly connected

COMPONENT PART : A major part of a component

CONTROL/COORDINATION : Refers to the safe performance of multiple tasks to be accomplished by two or more work centers/persons at the same time

CONTROL SIGNAL : A signal used to control electronic or mechanical devices

EMERGENCY : An event or series of events in progress that will cause damage to equipment or injury to personnel unless immediate corrective steps are taken

FUNDAMENTALS : Basic facts, theories, laws or principles (100 Section in PQS)

INFREQUENT TASKS : Tasks performed under casualty conditions or tasks that are not done as a regular part of watchstation routine; may be simulated

INTERLOCK : A protective device to prevent the unsafe operation of equipment or to sequence the action of systems, components or component parts

MAINTENANCE ACTION : A maintenance technician qualification that measures ability to perform a designated task

NORMAL OPERATING VALUE : The point at which satisfactory performance may be expected

OPERATING LIMITS : Maximum and minimum allowable values

PARAMETER : A variable (temperature, pressure, flow rate, voltage, current, frequency, etc.) that must be indicated, monitored, checked or sensed during operation or testing

PROTECTIVE FEATURE : A device designed to prevent damage or injury

SENSING POINT : The point in a system at which a signal may be detected

SET POINT : The value of a parameter at which: (a) an alarm is set off, (b) operator action is required, (c) valves open or shut, (d) proper operation stops and damage may occur, or (e) the optimum value for normal operation

SOURCES OF POWER : Circuits or devices that supply power, energy or charge to a component/component part; includes electrical, mechanical, hydraulic and pneumatic

SUPPORT ACTION : A qualification that measures the ability to perform specific or repetitive tasks that do not involve the correction of a malfunction or repair of equipment

SYSTEMS : Groups of components that operate together to perform specific functions (200 Section in PQS)

SYSTEM INTERFACE : (a) How outside influences affect the operation of this system, or (b) How the operation of this system affects the operation of other systems or equipment

UNDER INSTRUCTION WATCHES : The trainee will perform the duties and tasks of the watchstation under the *direct* supervision of a qualified watchstander or supervisor. This is intended to provide a one-on-one training situation

UNDER QUALIFIED SUPERVISION WATCHES : The trainee will perform the duties and tasks of the watchstation with minor guidance from a qualified watchstander or supervisor; this is intended to provide the trainee with proficiency while standing the watch in an operational environment

WATCHSTATION : An operator qualification that includes duties, assignments or responsibilities that an individual may be called upon to perform (not necessarily limited to a specific time period) (300 Section in PQS)

100 INTRODUCTION TO FUNDAMENTALS

100.1 INTRODUCTION

This PQS begins with a Fundamentals section covering the basic knowledge and principles needed to understand the equipment or duties to be studied. Normally, you would have acquired the knowledge required in the Fundamentals section during the school phase of your training. All references cited for study are selected according to their credibility and availability.

100.2 SAFETY

Because safety is of paramount consideration, the first subsection of Fundamentals describes the safety precautions which apply throughout the PQS. This permits a subsequent listing in the Systems sections of those safety precautions *unique* to a given system.

100.3 HOW TO COMPLETE

The fundamentals you will have to complete are listed in the watchstation (300 section) for each watchstation. You should complete all required fundamentals before starting the systems and watchstation portions of this PQS, since the knowledge gained from fundamentals will aid you in understanding the systems and your watchstation tasks. When you feel you have a complete understanding of one fundamental or more, contact your Qualifier. If you are attempting initial qualification, your Qualifier will expect you to satisfactorily answer all line items in the fundamentals before signing off completion of that fundamental. If you are requalifying or have completed the appropriate schools, your Qualifier may require you to answer representative line items to determine if you have retained the necessary knowledge for your watchstation. If your command requires an oral board or written examination for final qualification, you may be asked any questions from the fundamentals required for your watchstation.

101 SAFETY PRECAUTIONS FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving

101.1 Discuss the general safety precautions involved in planning a dive. [ref. a, ch. 4]

.2 Discuss the safety precautions involved in the following dives:

a. SCUBA dive [ref. a, chs. 5, 7]
b. Surface-supplied air dive [ref. a. chs. 6, 7]
c. Mixed-gas surface-supplied dive [ref. a, ch. 6; ref. b, chs. 10, 11]

.3 Discuss the safety precautions involved in the following: [ref. a]

a. Underwater search and recovery operations [chs. 4, 6]
b. Diving in heavy currents/surf zone [chs. 4, 5]
c. Diving in ice cold water [chs. 3, 4, 8]
d. Diving in polluted waters [ch. 4]
e. Sonar hazards [ch. 4]
f. Altitude diving [ch. 4]
g. Flying after diving [ch. 4]

.4 What general safety precautions must be observed when using hyperbaric chambers? [ref. a, app. D]

.5 Discuss the safety precautions involved when: [ref. a]

a. Handling compressed gas cylinders [ch. 5]
b. Using high-pressure air/gases [ch. 6]
c. Using oxygen [app. L]

102 UNDERWATER PHYSIOLOGY AND FIRST AID FUNDAMENTALS

Reference:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving

102.1 Discuss the following conditions: [ch. 3]

a. Hypoxia
b. Oxygen toxicity
c. Carbon monoxide poisoning
d. Carbon dioxide excess (hypercapnia)
e. Asphyxia
f. Hyperventilation
g. Barotrauma
h. Pulmonary overinflation syndromes
i. Hypothermia
j. Dehydration

.2 What methods are used for the prevention of:

a. Decompression sickness [ch. 3]
b. Pulmonary overinflation syndrome [ch. 8]

.3 Define the following diving disorders: [ch. 8]

a. Type I decompression sickness (DCS)
b. Type II DCS
c. Altitude DCS
d. Gas embolism
e. Pulmonary overinflation syndrome

.4 Define the following basic life support techniques: [app. M]

a. Pulmonary resuscitation
b. Mouth-to-mouth resuscitation
c. Cardiac resuscitation
d. Control of bleeding
e. Pressure points
f. Shock

103 ORGANIZATION FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving, ch. 4
[b] OPNAVINST 3120.32B, Standard Organization and Regulations of the U.S. Navy (SORM)
[c] Ship's Standard Organization and Regulations Manual (SORM)

103.1 Identify the chain-of-command for your command's diving organization. [ref. c]

.2 What are the responsibilities of the following personnel during diving operations:

a. Commanding Officer (CO) [ref. a]
b. Executive Officer (XO) [refs. b, c]
c. Command Duty Officer/Officer of the Deck (CDO/OOD) [ref. a]
d. First Lieutenant [refs. b, c]
e. Engineering Officer [refs. a, b, c]
f. Diving Officer [refs. a, b, c]
g. Master Diver [refs. a, c]
h. Diving Supervisor [refs. a, c]
i. Diving Medical Officer/Diving Medical Corpsman [refs. a, c]
j. Qualified Divers [ref. a]

104 PLANNING PROCEDURES FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving
[c] NAVSEA S9086-TX-STM-010, Naval Ships' Technical Manual, ch. 583, Boats and Small Craft

104.1 How would various underwater conditions at the dive site influence your selection of the type of equipment to be used? [ref. a, ch. 4; ref. b, ch. 10]

.2 Describe the advantages and disadvantages of each type of diving equipment. [ref. a, ch. 4]

.3 Describe the effects of tides, currents, and atmospheric conditions. [ref. a, ch. 4]

.4 Explain the hazards peculiar to diving operations and discuss the safety precautions to be observed before diving. [ref. a, ch. 4 and app. G]

.5 Describe the normal and emergency communication methods utilized in surface supplied diving operations. [ref. a, ch. 6]

.6 Describe the restrictions and operational considerations for each type of diving equipment. [ref. a, ch. 4; ref. b, ch. 10]

.7 Describe the diving boat safety checklist. [ref. c, ch. 1]

.8 Describe the manning requirements for the various diving capabilities of your command. [ref. a, ch. 4; ref. b, ch. 10]

.9 Describe the emergency assistance checklist. [ref. a, ch. 4]

105 DIVING SYMBOLS AND FORMULAS FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] Naval Diving and Salvage Training Center Formula Worksheet

105.1 Discuss and compute the following as utilized in diving:

a. Atmospheres absolute (ATA) [ref. b]
b. Depth to psig [ref. b]
c. Compressor output [ref. b]
d. Minimum manifold psi [ref. a, ch. 6]
e. Compressor output (maximum depth) [ref. b]
f. Converting standard cubic feet (SCF) to actual cubic feet (ACF) and ACF to SCF [ref. b]
g. Cubic foot of gas in stowage [ref. a, ch. 6]
h. Cubic foot of gas in stowage available for use [ref. a, ch. 6]
i. Air diver consumption [ref. a, ch. 6]
j. Effective atmospheres (PPO2 ATT) [ref. a, app. C]
k. Rate of ascent to first stop [ref. a, ch. 6]

106 DIVING RECORDS AND REPORTS FUNDAMENTALS

Reference:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving

106.1 Identify the diving logs and records maintained at your command. [apps. B, E]

.2 State the purpose of each of your command's diving logs and records. [app. E; ch. 4]

.3 Explain the proper procedure for filling out the following: [app. E]

a. Command Smooth Dive Log
b. Dive Log (DD 2544)
c. Diver's Personal Log
d. Diving Mishap/Hyperbaric Treatment/Death Report
e. Accident/Incident Equipment Status Report
f. Failure Analysis Report

107 DIVERS' LIFE SUPPORT SYSTEM (DLSS) CERTIFICATION FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] NAVSEA SS521-AA-MAN-010, U.S. Navy Diving and Manned Hyperbaric Systems Safety Certification Manual
[c] Subject Matter Expert (SME's)

107.1 Discuss the chain-of-command that applies to your diver life support system (DLSS) up to the system certification authority (SCA). [ref. b, ch. 1]

.2 State the purpose and use of: [ref. b, ch. 2]

a. System certification scope
b. System certification survey cards

.3 Discuss the purpose and use of the presurvey outline booklet (PSOB). [ref. b, ch. 2]

.4 State the purpose of re-entry control (REC) as it pertains to a certified DLSS. [ref. b, ch. 3]

.5 Briefly describe some of the documentation required to support and to obtain a DLSS certification from an SCA. [ref. b, ch. 1]

.6 Describe the purpose of the air sampling program for diving systems. [ref. a, app. I]

.7 Discuss what QA manual applies to your command. [ref. c]

.8 Discuss systems cleanliness standards. [ref. b, app. G]

.9 Discuss DSS/DLSS quality assurance organization and qualifications. [ref. c]

.10 Discuss the use of systems operating and emergency procedural documentation. [ref. b, ch. 3]

108 AIR DIVING DECOMPRESSION TABLES FUNDAMENTALS

Reference:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving

108.1 Define the following terms used in diving operations: [ch. 7]

a. Descent time
b. Total bottom time
c. Decompression table
d. Decompression schedule
e. Decompression stop
f. Deepest depth
g. Maximum depth
h. Stage depth
i. Equivalent single dive bottom time
j. No decompression limits
k. Repetitive dive
l. Repetitive group designation
m. Residual nitrogen
n. Residual nitrogen time
o. Single dive
p. Single repetitive dive
q. Surface interval

.2 Discuss the criteria for selecting the decompression tables:

a. No-decompression limits and repetitive group designation table [ch. 7]
b. Standard air decompression table [ch. 7]
c. Surface decompression table using air [app. D]
d. Surface decompression table using oxygen [app. D]
e. Residual nitrogen timetables for repetitive air diving [ch. 7]

.3 Explain the rules for correcting variations in rate of ascent. [ch. 7]

.4 Explain an exceptional exposure dive. [ch. 7]

.5 Explain the RNT exception rule. [ch. 7]

109 TREATMENT TABLES FUNDAMENTALS

Reference:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving

109.1 State what tables are used in recompression treatments and their application. [ch. 8]

.2 Define the following terms as each applies to recompression treatment:

a. Decompression sickness (DCS) [ch. 8]
b. Type I DCS [ch. 8]
c. Type II DCS [ch. 8]
d. Gas embolism [ch. 8]
e. Central nervous system (CNS) symptoms [ch. 8]
f. Altitude decompression sickness [ch. 8]
g. Omitted decompression [ch. 8]
h. Oxygen toxicity [ch. 8]
i. Pulmonary overinflation syndromes [ch. 8]
j. In-water treatment [ch. 8]
k. Ancillary care [ch. 8]
l. Rate of descent [ch. 8]
m. Carbon monoxide poisoning [ch. 8]
n. Neurological exam [app. H]
o. Dive profile [ch. 7; app. H]

.3 Define the following as each applies to recompression treatment:

a. Rules for recompression treatment [ch. 8]
b. Ventilation requirements [app. D]
c. Manning requirements [ch. 8]
d. Medical personnel requirements for treatment [ch. 8]

.4 Describe the steps for treatment of: [ch. 8]

a. Type I DCS
b. Type II DCS
c. Gas embolism
d. Recurrence during treatment
e. Recurrence following treatment
f. Omitted decompression
g. Overinflation syndromes

.5 Describe the steps to be taken if: [ch. 8]

a. Oxygen breathing during treatment must be interrupted due to onset of O_2 toxicity symptoms

109 TREATMENT TABLES FUNDAMENTALS (CONT'D)

109.5 b. Oxygen treatment table must be extended
c. Relief is not complete
d. Condition worsening

.6 Explain the need for recompression treatment and treatment schedule. [ch. 8]

.7 How is the proper treatment table selected? [ch. 8]

.8 What are the symptoms of oxygen toxicity? [ch. 8]

.9 Discuss temperature control and patient hydration. [ch. 8]

.10 How is recompression treatment accomplished in the water? [ch. 8]

.11 Discuss the transporting of a diver requiring treatment, when the chamber is not at the dive site. [ch. 8]

.12 Discuss post treatment care/observation and restrictions for future diving. [ch. 8]

.13 Discuss inside temperature O_2/decompression requirements. [ch. 8]

.14 Discuss patient eating/sleeping during treatment. [ch. 8]

110 HYPERBARIC CHAMBER FUNDAMENTALS

Reference:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving

110.1 Identify the types of recompression chambers utilized in the U.S. Navy. [app. D]

.2 Discuss the application of the hyperbaric chamber. [app. D]

.3 State the maximum operating pressure. [app. D]

.4 Discuss the minimum primary and secondary air supply requirements. [app. D]

.5 Discuss the rules for ventilation with built in breathing system (BIBS) dump/without BIBS dump. [app. D]

.6 State the reason for limiting synthetic fibers of bedding and clothing inside the chamber. [app. D]

.7 Discuss the contents and location of primary and secondary medical kit. [ch. 8]

.8 Discuss normal/emergency methods of communication. [app. D]

.9 State the working pressure of the oxygen regulator. [app. D]

.10 Discuss the predive and postdive checks conducted on the recompression chamber's electrical system. [app. D]

.11 Discuss fire prevention/suppression system. [app. D]

.12 Discuss the special safety precautions pertaining to hyperbaric chamber. [app. D]

.13 Discuss the maximum permissible exposure times at various temperatures in the recompression chamber. [ch. 8]

.14 Discuss the maximum permissible oxygen and carbon dioxide levels in the recompression chamber. [ch. 8]

.15 Discuss the decompression of inside tender during chamber operations. [ch. 8]

111 OPEN CIRCUIT SCUBA FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving

111.1 State the minimum equipment required by a scuba diver. [ch. 5]

.2 Who approves equipment for use by navy divers? [ch. 5]

.3 Discuss the types of scuba cylinders, their working pressures, and reserve pressure approved for use by the navy. [ch. 5]

.4 Discuss the air reserve mechanism operation. [ch. 5]

.5 Discuss the types of life preservers, including the depth limitation, and minimum carbon dioxide (CO_2) cartridge weight, in your command. [ch. 5]

.6 What minimum information should the scuba diver obtain prior to entering the water? [ch. 5]

.7 Discuss what items should be checked during the predive inspection and predescent surface check. [ch. 5]

.8 Discuss the means of communication used between scuba divers and topside. [ch. 5]

.9 What must be provided to the scuba diver when diving underneath floating hulls? [ch. 5]

.10 Discuss when a decompression dive can be made by a scuba driver and who must approve it. [ch. 5]

.11 Who is responsible for the immediate postdive maintenance of scuba equipment? [ch. 5]

.12 State the normal and maximum working depth limitations for scuba. [ch. 4]

.13 State the minimum number of personnel required, and who they are for a scuba dive. [ch. 4]

.14 Discuss the advantages and disadvantages of diving scuba. [ch. 4]

.15 Discuss the inspection and hydro requirement of scuba cylinders. [ch. 5]

112 SURFACE SUPPLIED DIVING SYSTEM FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving, ch. 4
[b] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving, ch. 10
[c] NAVSEA S6560-AG-OMP-010, Underwater Breathing Apparatus, MK 21 MOD 1
[d] NAVSEA SS600-AK-MMO-010, Breathing Apparatus, Underwater (UBA), MK 20 MOD 0

112.1 Identify the 3 types of surface supplied air and mixed gas diving rigs. [refs. a, b; ref. c, ch. 2; ref. d, ch. 1]

.2 What are the applications, advantages and disadvantages of each? [refs. a, b]

.3 State the minimum number of personnel required to man the side for each rig. [refs. a, b]

.4 What are the normal and maximum working limits of: [refs. a, b]

-MK 21, MOD 1 air
-MK 21, MOD 1 gas
-MK 20, MOD 0

113 GAS MIXING AND ANALYSIS FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving, app. C
[b] Manufacturer's Technical Manual
[c] Subject Matter Experts (SME's)

113.1 Describe how the following equipment is used: [refs. b, c]

a. Gas transfer pump
b. Helium oxygen (HeO_2) mixing manifold
c. Automatic gas mixing unit
d. Carbon dioxide (CO_2) analyzer
e. Oxygen (O_2) analyzer

.2 Discuss the following mixing procedures: [ref. a]

a. Mixing by partial pressure
b. Single cylinder mixing
c. Multi cylinder mixing
d. Continuous flow mixing
e. Mixing by volume
f. Mixing by weight

.3 What methods are available to analyze gas? [ref. a]

114 SURFACE SUPPLIED HELIUM OXYGEN DECOMPRESSION FUNDAMENTALS

Reference:

[a] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving, ch. 11

114.1 Discuss gas mixtures.

.2 Discuss surface supplied helium-oxygen compression and decompression procedures.

.3 Discuss special procedures for descent with less than 16 percent oxygen.

.4 Discuss procedures for shifting to 60 percent helium/40 percent oxygen at 100 FSW.

.5 Discuss procedures for shifting to 100 percent oxygen at the first oxygen stop.

.6 Discuss ascent from the 40 FSW water stop.

.7 Discuss the following decompression procedures:

a. Normal SUR D procedures using oxygen
b. Emergency SUR D procedures using oxygen
c. Aborted dive during descent

.8 Discuss the special procedures for diving with an oxygen partial pressure greater than 1.3 ata.

.9 Discuss the following surface supplied helium-oxygen emergency procedures:

a. Bottom time in excess of the table
b. Loss of helium-oxygen supply on the bottom
c. Inability to shift to 40 percent oxygen at 100 FSW during decompression
d. Loss of oxygen supply at 50 FSW
e. Loss of oxygen supply at the 40 foot stop
f. Oxygen supply contaminated with helium oxygen
g. Central nervous system (CNS) oxygen toxicity symptoms (nonconvulsive) at the 50 foot stop
h. CNS oxygen toxicity symptoms (nonconvulsive) at the 40 foot stop
i. CNS oxygen convulsion at the 50 foot stop or 40 foot stop
j. Omitted decompression
k. Lightheaded or dizzy diver on the bottom
l. Unconscious diver on the bottom
m. Decompression sickness in the water

.10 Discuss variation in rate of ascent.

115 MK 16 MOD O CLOSED CIRCUIT MIXED GAS UBA FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving, ch. 13
[b] NAVSEA SS600-AH-MMA-010, Underwater Breathing Apparatus, MK 16 MOD 0

115.1 Discuss the applications of the MK-16 MOD 0. [ref. a; ref. b, ch. 1]

.2 Discuss the function of the following: [ref. a; ref. b, ch. 2]

a. Housing/equipment case subassembly
b. Recirculation System
c. Electronics System
d. Pneumatics System

.3 Discuss depth and duration limits of the rig. [ref. a; ref. b, ch. 1]

.4 Discuss the following diving procedures: [ref. a]

a. Single marked diving
b. Paired marked diving
c. Tended diving

.5 Discuss diving equipment requirement. [ref. a]

116 DRAEGER LAR V UBA FUNDAMENTALS

References:

[a] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving, ch. 14
[b] NAVSEA SS600-AJ-MMO-010, Underwater Breathing Apparatus LAR V

116.1 Discuss the term "closed circuit oxygen rebreather". [ref. a]

.2 Discuss the pertinent physical characteristics of the Draeger LAR V UBA. [ref. a]

.3 Discuss the gas flow path of Draeger LAR V. [ref. b, ch. 3]

.4 Discuss the operation duration and the two constraining factors for the Draeger LAR V. [ref. a; ref. b, ch. 2]

.5 Discuss the two categories of closed-circuit oxygen exposure limits: [ref. a]

a. Transit with excursion limits
b. Single depth limits

.6 Discuss the purpose of the purge procedure for the Draeger LAR V. [ref. a]

.7 Discuss the possible errors which could happen during the purge procedures. [ref. a]

200 INTRODUCTION TO SYSTEMS

200.1 BASIC BUILDING BLOCKS

In this section, the equipment is broken down into smaller, more comprehensible, functional *systems* as the basic building blocks in the learning process. Each system is written to reflect specific watchstation requirements by identifying the equipment most relevant to one or more designated watchstanders. The less complex systems may be identified and covered quickly or relegated to a lower priority to permit greater emphasis on more significant or complex systems.

200.2 COMPONENTS AND COMPONENT PARTS

For learning purposes each system is disassembled into two levels. Systems have *components* and components have *parts*. Do not expect to see every item which appears on a parts list to be in the PQS. Only those items which must be understood for operation/maintenance are listed. Normally a number of very broad (overview) systems are disassembled into their components or parts with the big picture as the learning goal. Items listed as components in such a system may then be analyzed as separate systems and broken down into components and parts. Example: the turbogenerators may be listed as a component of the Ship's Service Electrical Distribution System and then later detailed as an individual system for closer study.

200.3 FORMAT

Each system is organized within the following format:

•It lists the references to be used for study and asks you to explain the function of the system.
•It asks for the static facts of *what* or *where* the components and component parts are in relation to the system.
•It directs attention to the dynamics of *how* the component and component parts operate to make the system function.
•It specifies the parameters that must be immediately recalled.
•It requires study of the relationship between the system being studied and other systems or areas.
•It requires discussion of safety devices which protect the system, as well as unique safety precautions that apply to personnel and equipment.

200.4 HOW TO COMPLETE

The systems you must complete are listed in the Prerequisites section of each watchstation. When you have mastered one or more systems, contact your Qualifier. The Qualifier will give you an oral examination on each system and, if satisfied you have sufficient knowledge of the system, will sign the appropriate system line items. You will be expected to demonstrate through oral or written examination a thorough understanding of each system required for your watchstation.

201 OPEN CIRCUIT SCUBA SYSTEM

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] Subject Matter Experts (SME's)

201.1 FUNCTION

201.1.1 What is the function of this system? [ref. a, ch. 5]

201.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?
B. Where is it located?
C. What are the modes of operation or control?
D. What are the safety/protective devices for this component/component part?
E. What protection is provided by this component/component part?
F. What are the probable indications if this component fails?

		A	B	C	D	E	F
201.2.1	Scuba regulator [A: ref. a, ch. 5] [C: ref. a, ch. 8]	X		X			
.2	Octopus regulator [ref. a, ch. 5]			X	X	X	
.3	Scuba bottle manifold [A thru D: ref. a, ch. 5] [F: ref. b]	X	X	X	X		X
.4	Cylinder [ref. a, ch. 5]			X	X		
.5	Reserve valve [ref. a, ch. 5]			X	X	X	
.6	High pressure blow out plug [A, B, E: ref. a, ch. 5] [F: ref. b]	X	X			X	X

201.3 PRINCIPLES OF OPERATION

201.3.1 How do the components work together to achieve the system's function? [ref. a, ch. 5]

201.4 PARAMETERS/OPERATING LIMITS

201.4.1 For the open circuit scuba, answer the following questions:

A. What are the depth limits? [ref. a, ch. 4]
B. What is the minimum/maximum operating pressure? [ref. b]
C. What is the reserve operating pressure? [ref. a, ch. 5]
D. What is the maximum charging rate? [ref. a, ch. 5]

201 OPEN CIRCUIT SCUBA SYSTEM (CONT'D)

201.5 SYSTEM INTERFACE

201.5.1 How does this system interface with the MK 20 MOD 0 UBA? [ref. a, ch. 5]

201.6 SAFETY PRECAUTIONS

201.6.1 What safety precautions must be observed when operating this system? [ref. a, ch. 5]

202 MK 20 MOD 0 UNDERWATER BREATHING APPARATUS (UBA) SYSTEM

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] NAVSEA SS600-AK-MMO-010, Breathing Apparatus, Underwater (UBA), MK 20 MOD 0
[c] Subject Matter Experts (SME's)

202.1 FUNCTION

202.1.1 What is the function of this system? [ref. a, ch. 4; ref. b, ch. 1]

202.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?
B. Where is it located?
C. What are the modes of operation or control?
D. What are the safety/protective devices for this component/component part?
E. What protection is provided by this component/component part?
F. What are the probable indications if this component fails?
G. What are the ratings of this component?

		A	B	C	D	E	F	G
202.2.1	Full face mask (FFM) [A: ref. b, ch. 3] [E, F: ref. c]	X				X	X	
	a. Visor [ref. b, ch. 3]	X				X		
	b. Head harness [A, E: ref. b, ch. 3] [F: ref. c]	X				X	X	
	c. Inner oral - nasal mask [ref. b, ch. 3]	X				X	X	
	d. Mask body assembly [ref. b, ch. 3]		X					
.2	FFM demand regular [A, D, G: ref. b, ch. 3] [F: ref. c]	X		X		X	X	
.3	Umbilical assembly [A, E: ref. b, ch. 3] [F: ref. c]	X				X	X	
.4	Communications System [A thru C: ref. b, ch. 3] [F: ref. c]	X	X	X		X		
.5	Hose assembly, umbilical to mask [A, B: ref. b, ch. 3] [F: ref. c]	X	X			X		
.6	Harness assembly [A: ref. b, ch. 3] [B, E, F: ref. c]	X	X			X	X	
.7	Emergency gas supply [ref. a, ch. 6]	X	X			X		

202.3 PRINCIPLES OF OPERATION

202.3.1 How do the components work together to achieve the system's function? [ref. b, ch. 1]

202 MK 20 MOD 0 UNDERWATER BREATHING APPARATUS (UBA) SYSTEM (CONT'D)

202.4 PARAMETERS/OPERATING LIMITS

202.4 What is the normal operating depth for the items listed: [ref. a, ch. 4]

202.4.1 Without emergency gas supply
.2 With emergency gas supply

202.5 SYSTEM INTERFACE — None to be discussed.

202.6 SAFETY PRECAUTIONS

202.6.1 What safety precautions must be observed when diving? [ref. a, ch. 6; ref. b, ch. 1]

203 MK 21 MOD 1 SURFACE SUPPLIED DIVING AIR/MIXED GAS SYSTEM

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving
[c] NAVSEA S6560-AG-OMP-010, Underwater Breathing Apparatus, MK 21 MOD 1
[d] Subject Matter Experts (SME's)

203.1 FUNCTION

203.1.1 What is the function of this system? [ref. c, ch. 3]

203.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?
B. Where is it located?
C. What are the modes of operation or control?
D. What are the safety/protective devices for this component/component part?
E. What protection is provided by this component/component part?
F. What are the probable indications if this component fails?

		A	B	C	D	E	F
203.2.1	Helmet shell assembly [ref. c, ch. 3]			X			X
	a. Weights [ref. c, ch. 3]			X			
	b. Neck Clamp/yoke assembly [A, D, E: ref. c, ch. 3] [F: ref. d]			X		X	X
	c. Water dump valve [A, C, D: ref. c, ch. 3] [B, F: ref. d]	X	X	X	X		X
.2	Side block and bent tube assembly [A: ref. c, ch. 3] [B: ref. c, ch. 6] [C: ref. d]			X	X		
	a. Gas supply nonreturn valve [A, E: ref. c, ch. 3] [B: ref. c, ch. 6] [F: ref. d]			X	X		X
	b. Emergency gas supply valve [A, E: ref. c, ch. 3] [B: ref. c, ch. 6] [C, F: ref. d]			X	X		X
	c. Steady flow valve [A, E: ref. c, ch. 3] [B: ref. c, ch. 6] [C, F: ref. d]			X	X		X
.3	Demand regulator [A: ref. c, ch. 3] [B: ref. c, ch. 6] [C, F: ref. d]			X	X		X
	a. Dial-A-breath [A, B: ref. c, ch. 3] [C, F: ref. d]			X	X		X

203 MK 21 MOD 1 SURFACE SUPPLIED AIR/MIXED GAS SYSTEM (CONT'D)

		A	B	C	D	E	F
203.2.3	b. Exhaust valve [A, B, E: ref. c, ch. 3] [F: ref. d]	X	X			X	X
.4	Oral nasal assembly [A, D: ref. c, ch. 3] [B: ref. c, ch. 6]		X	X		X	
.5	Gas train assembly [A, C: ref. c, ch. 3] [B: ref. c, ch. 6}			X	X	X	
.6	Earphones, microphone, and communications cable [A, F: ref. d] [B: ref. c, chs. 1, 6]	X	X				X
.7	Umbilical assembly [ref. d]				X		
.8	Emergency Gas Supply System [A, C, D, F: ref. d] [B: ref. c, ch. 1]	X	X	X	X		X
	a. Emergency gas cylinder [A, C, D: ref. d] [B: ref. c, ch. 6]	X	X	X	X		
.9	Diver's safety harness [A: ref. c, ch. 3] [B: ref. c, ch. 6] [E: ref. d]	X	X			X	

203.3 PRINCIPLES OF OPERATION

203.3.1 How do the components work together to achieve the system's function? [ref. c, ch. 2]

.2 List the actions to be performed in the following emergency situations: [ref. c, ch. 2]

a. Helmet flooding
b. Excessive breathing resistance
c. Umbilical gas supply failure
d. Demand regulator free flow
e. Fouled or pinned umbilical

203.4 PARAMETERS/OPERATING LIMITS

203.4.1 For the items listed, answer the following questions:

A. What is the normal operating depth?
B. What is the maximum operating depth?

		A	B
203.4.1	Without emergency gas cylinder breathing air [ref. a, ch. 4]		X
.2	With emergency gas cylinder breathing air using $\frac{3}{8}$" umbilical [ref. d]	X	X
.3	With emergency gas cylinder breathing air using $\frac{1}{2}$" umbilical [ref. a, ch. 4]		X
.4	With emergency gas cylinder breathing mixed gas using $\frac{1}{2}$" umbilical [ref. b, ch. 10]	X	X

203 MK 21 MOD 1 SURFACE SUPPLIED AIR/MIXED GAS SYSTEM (CONT'D)

203.5 SYSTEM INTERFACE

203.5.1 How does this system interface with the DLSS Air/Mixed Gas/Oxygen System? [ref. d]

203.6 SAFETY PRECAUTIONS

203.6.1 What safety precautions must be observed when operating this system? [ref. b, ch. 10; ref. c, ch. 1]

204 MK 16 MOD 0 UNDERWATER BREATHING APPARATUS SYSTEM

References:

[a] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving, ch. 13
[b] NAVSEA SS600-AH-MMA-010, Underwater Breathing Apparatus, MK 16 MOD 0

204.1 FUNCTION

204.1.1 What is the function of this system? [ref. a; ref. b, ch. 1]

204.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?
B. Where is it located?
C. What are the sources of power?
D. What are the modes of operation or control?
E. What are the safety/protective devices for this component/component part?
F. What protection is provided by this component/component part?
G. What are the probable indications if this component fails?
H. What is the source of control signals?
I. What is the function of each position?
J. What are the interlocks?

		A	B	C	D	E	F	G	H	I	J
204.2.1	Housing assembly [A: ref. a; ref. b, ch. 2] [B, E, F: ref. b, ch. 2]		X	X			X	X			
.2	Harness assembly [ref. b, ch. 2]		X	X				X			
.3	Mouthpiece/hose assembly [A: ref. a; ref. b, ch. 2] [B: ref. b, chs. 1, 2] [D, E: ref. b, ch. 2]		X	X		X	X				
.4	Scrubber/moisture absorber [A: ref. a; ref. b, ch. 2] [B, F: ref. b, ch. 2] [G: ref. b, ch. 3]		X	X				X	X		
.5	O_2 sensor and controls [A, I: ref. a; ref. b, ch. 2] [B, C, F, H: ref. b, ch. 2] [G: ref. b, ch. 5]		X	X	X		X	X	X	X	
.6	Primary electronics [A, D: ref. a; ref. b, ch. 2] [B: ref. b, ch. 1] [C, E, F, H, J: ref. b, ch. 2] [G: ref. b, ch. 3]		X	X	X	X	X	X	X	X	X

204 MK 16 MOD 0 UNDERWATER BREATHING APPARATUS SYSTEM (CONT'D)

		A	B	C	D	E	F	G	H	I	J
204.2.7	Primary indicator [A, B, C, I: ref. a; ref. b, ch. 2] [E, H, J: ref. b, ch. 2] [F, G: ref. b, ch. 3]	X	X	X	X	X	X	X	X	X	X
.8	Secondary indicator A, D, F, H, J: ref. b, ch. 2] [B: ref. b, ch. 1] [C: ref. b, ch. 6] [G: ref. b, ch. 5]	X	X	X	X	X	X	X	X		
.9	O_2 cylinder [A: ref. a] [B: ref. b, ch. 1]		X	X							
.10	Diluent cylinder [A: ref. a] [B: ref. b, ch. 1]		X	X							

204.3 PRINCIPLES OF OPERATION

204.3.1 How do the components work together to achieve the system's function? [ref. b, ch. 2]

.2 Draw a diagram of this system. [ref. b, ch. 2]

204.4 PARAMETERS/OPERATING LIMITS

204.4.1 For the MK 16 UBA listed, answer the following questions: [A thru C: ref. b, ch. 2] [D: ref. a] [E: ref. a; ref. b, ch. 1] [F: ref. b, ch. 1]

A. Where are the parameters sensed or monitored?
B. What is the physical location of the indicators?
C. What is the alarm set point?
D. What is minimum drive pressure for O_2 reducer?
E. What is canister duration limits?
F. What is maximum depth limitations?

204.5 SYSTEM INTERFACE — None to be discussed.

204.6 SAFETY PRECAUTIONS

204.6.1 What safety precautions must be observed when operating this system? [ref. b, ch. ix]

205 DRAEGER LAR V UBA SYSTEM

References:

[a] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving, ch. 14
[b] NAVSEA SS600-AJ-MMO-010, Underwater Breathing Apparatus LAR V

205.1 FUNCTION

205.1.1 What is the function of this system? [ref. a; ref. b, ch. 1]

205.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?
B. Where is it located?
C. What are the modes of operation or control?
D. What are the safety/protective devices for this component/component part?
E. What protection is provided by this component/component part?
F. What are the probable indications if this component fails?
G. What is the function of each position?

		A	B	C	D	E	F	G
205.2.1	Oxygen cylinder [A, B: ref. a; ref. b, ch. 3] [D: ref. b, ch. 1] [G: ref. b, ch. 3]	X	X		X			X
.2	CO_2 scrubber canister [A: ref. a; ref. b, ch. 3] [B: ref. b, ch. 3] [D: ref. a; ref. b, ch. 1] [E, F: ref. a]	X	X		X	X	X	
.3	Exhaust/supply hose/mouthpiece [A: ref. a; ref. b, ch. 3] [B thru D: ref. b, ch. 3] [F: ref. b, ch. 5]	X	X	X	X		X	
.4	Breathing bag [A, E: ref. b, ch. 3] [B: ref. b, chs. 2, 3] [F: ref. b, ch. 5]	X	X			X	X	
.5	Automatic demand valve/bypass knob [A, B, D: ref. b, ch. 3] [C: ref. a; ref. b, ch. 3] [F: ref. b, ch. 2] [G: ref. b, chs. 2, 3]	X	X	X	X		X	X
.6	Oxygen pressure regulator [A, B, C, D: ref. b, ch. 3] [E: ref. b, chs. 3, 5] [F: ref. b, ch. 5]	X	X	X	X	X	X	

205 DRAEGER LAR V UBA SYSTEM (CONT'D)

205.3 PRINCIPLES OF OPERATION

205.3.1 How do the components work together to achieve the system's function? [ref. b, ch. 3]

.2 Draw a diagram of this system. [ref. a; ref. b, ch. 3]

.3 Using a diagram of the system, show the path of oxygen from the oxygen cylinder/breathing bag to the diver. [ref. a; ref. b, ch. 3]

.4 What is the sequence of component involvement to surface purge the LAR V? [ref. a; ref. b, ch. 2]

205.4 PARAMETERS/OPERATING LIMITS

205.4.1 For the Draeger LAR V, answer the following questions:

A. What is the maximum depth/time limits? [ref. a; ref. b, ch. 2]
B. What are the maximum operating pressures? [ref. b, ch. 3]
C. What are the canister duration limits? [ref. a; ref. b, ch. 1]

205.5 SYSTEM INTERFACE — None to be discussed.

205.6 SAFETY PRECAUTIONS

205.6.1 What safety precautions must be observed when operating this system? [ref. b, p. ix]

206 HYPERBARIC CHAMBER SYSTEM

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] Subject Matter Experts (SME's)
[c] Manufacturer's Technical Manual
[d] System Emergency Procedures (EP's)

206.1 FUNCTION

206.1.1 What is the function of this system? [ref. a, app. D]

206.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated for each:

A. What is its function?
B. Where is it located?
C. What are the sources of power?
D. What are the modes of operation or control?
E. What protection is provided by this component/component part?
F. What are the probable indications if this component fails?

		A	B	C	D	E	F
206.2.1	One-way supply and exhaust valves [ref. a, app. D]			X	X		
.2	Two-way supply and exhaust valves [ref. a, app. D]			X	X		
.3	Depth gage [ref. a, app. D]			X	X		
.4	Relief valve [ref. a, app. D]			X	X		X
.5	Communication [ref. a, app. D]			X	X	X	
.6	Oxygen supply [ref. a, app. D]			X			
.7	Fire protection [ref. a, app. D]			X	X		
.8	Lighting [A, D: ref. a, app. D] [C, F: ref. b]	X		X	X	X	
.9	Environmental Control System [ref. a, app. D]			X			
.10	Medical kits [ref. a, ch. 8]			X	X		

206.3 PRINCIPLES OF OPERATION

206.3.1 How do the components work together to achieve the system's function? [ref. c]

.2 Using a diagram of the system, show the path of: [ref. c]

a. High pressure (HP) air from the compressor(s) to the chamber
b. Low pressure (LP) air from the compressor(s) to the chamber
c. Oxygen from the bank(s) to the chamber

206 HYPERBARIC CHAMBER SYSTEM (CONT'D)

206.3.3 What is the sequence of component involvement to accomplish the line up of the system? [ref. c]

206.4 PARAMETERS/OPERATING LIMITS

206.4.1 For the recompression chamber, answer the following questions: [ref. a, app. D]

A. What is the normal operating pressure?
B. What are the allowable operating depths?
C. What is the maximum allowable inside atmospheric oxygen/carbon dioxide percentages?
D. What are the ventilation rates?

206.5 SYSTEM INTERFACE

206.5.1 How do the following outside influences affect the operation of this system: [ref. d]

a. Loss of electrical power
b. Loss of primary air supply

206.6 SAFETY PRECAUTIONS

206.6.1 What safety precautions must be observed when operating this system? [ref. a, app. D]

207 DIVER'S LIFE SUPPORT MIXED GAS/AIR SYSTEM

References:

[a] NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
[b] NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving
[c] NAVSEA SS521-AA-MAN-010, U.S. Navy Diving and Manned Hyperbaric Systems Safety Certification Manual, app. B
[d] Manufacturer's Technical Manual
[e] Subject Matter Experts (SME's)
[f] Command Generated System OPs and EPs

207.1 FUNCTION

207.1.1 What is the function of this system? [ref. c]

207.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?
B. What are the sources of power?
C. What are the modes of operation or control?
D. What are the safety/protective devices for this component/component part?
E. What are the probable indications if this component fails?

		A	B	C	D	E
207.2.1	Air compressors HP/LP [A, E: ref. c] [B, C: ref. a, ch. 6] [D: ref. d]	X	X	X	X	X
.2	Flasks [ref. a, ch. 6]			X		X
.3	Receivers [ref. e]			X		
.4	Diver's Life Support system (DLSS) [A, C: ref. a, ch. 6] [D: ref. e]	X		X	X	X
.5	Filters [ref. c]			X		X
.6	Moisture separators [ref. c]			X		
.7	Gas Transfer System [A: ref. e] [B, D: ref. d]	X	X		X	
.8	Mix maker [A: ref. b, app. C] [B, D: ref. d] [E: ref. e]	X	X		X	X
.9	Valves/reducers/piping/hoses [ref. e]			X		

207.3 PRINCIPLES OF OPERATION

207.3.1 How do the components work together to achieve the system's function? [ref. c]

207.3.2 Using a diagram of the system, show the path of air/gas flow through each system [ref. d]

.3 Discuss Ops and Eps for each system. [ref. f]

.4 What indications will you receive if the system is malfunctioning? [ref. f]

207.4 PARAMETERS/OPERATING LIMITS

207.4.1 For the items listed, answer the following questions:

A. What is the normal operating value?
B. What are the allowable operating limits?
C. What is the physical location of the indicators?
D. What calculations are required?

		A	B	C	D
207.4.1	Working pressure [ref. d]	X	X	X	
.2	Temperature parameters [ref. d]	X	X	X	
.3	Relief valve set pressures [A, C: ref. d] [B: ref. e]	X	X	X	
.4	System storage capacity [ref. d]	X	X	X	
.5	Usable gas capacity [B: ref. e] [D: ref. a, ch. 6]		X		X

207.5 SYSTEM INTERFACE

207.5.1 How do the following outside influences affect the operation of this system:

a. Loss of electrical power [ref. f]
b. Variations in contaminants [ref. e]
c. Variations in temperature [ref. e]
d. Variations in moisture [ref. e]

207.6 SAFETY PRECAUTIONS

207.6.1 What special safety precautions apply to:

a. Charging gas/air flasks [ref. a, ch. 5]
b. Transferring gas [ref. f]
c. Operating compressor [ref. d]

208 DIVING WATER HEATER SYSTEM

References:

[a] Manufacturer's Technical Manual
[b] Subject Matter Experts (SME's)

208.1 FUNCTION

208.1.1 What is the function of this system? [ref. b]

208.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each: [ref. a]

A. What is its function?
B. Where is it located?
C. What are the sources of power?
D. What are the modes of operation or control?
E. What are the safety/protective devices for this component/component part?

		A	B	C	D	E
208.2.1	Boiler/burner/aquastat	X	X	X		
.2	Pump	X		X		X
.3	Piping, valves and flowmeter		X			X
.4	Hose		X			

208.3 PRINCIPLES OF OPERATION

208.3.1 How do the components work together to achieve the system's function? [ref. a]

.2 Using a diagram of the system, show the path of hot water from the suction hose to the diver. [ref. a]

.3 What is the sequence of component involvement to set up and operate the heater? [ref. a]

208 DIVING WATER HEATER SYSTEM (CONT'D)

208.4 PARAMETERS/OPERATING LIMITS

208.4.1 For the items listed, answer the following questions: [ref. a]

A. What are the allowable operating limits?
B. Where are the parameters sensed or monitored?

208.4.1 Hot water pump
.2 Boiler

208.5 SYSTEM INTERFACE

208.5.1 How do the following outside influences affect the operation of this system: [ref. a]

a. Seawater temperature
b. Depth of dive
c. Breathing medium

.2 How does this system interface with the diver's hot water suit? [ref. a]

208.6 SAFETY PRECAUTIONS

208.6.1 What safety precautions must be observed when operating this system? [ref. a]

209 DIVER UNDERWATER COLOR TELEVISION SYSTEM

References:

[a] 110040/S-Tron Diving Underwater Color Television System (Ducts) Operating and Maintenance
[b] Subject Matter Experts (SME's)

209.1 FUNCTION

209.1.1 What is the function of this system? [ref. a, ch. 4]

209.2 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?
B. What are the sources of power?
C. What are the modes of operation or control?
D. What are the safety/protective devices for this component/component part?
E. What are the probable indications if this component fails?
F. What is the function of each position?

		A	B	C	D	E	F
209.2.1	Diver camera/light assembly/diver monitor [A: ref. a, chs. 1, 2, 4] [C: ref. a, ch. 4] [E: ref. a, ch. 5]	X		X		X	
.2	Surface control unit [B: ref. a, ch. 4] [A, C, D, F: ref. a, ch. 2] [E: ref. a, ch. 5]	X	X	X	X	X	X
.3	Video cassette recorder assembly [A: ref. a, ch. 2] [C: ref. a, ch. 4] [E: ref. a, ch. 5]	X		X		X	
.4	Annotation keyboard [A: ref. a, ch. 2] [C: ref. a, app. B] [E: ref. a, ch. 5]	X		X		X	
.5	Topside video camera [A: ref. a, ch. 4] [C: ref. a, ch. 2]	X		X			
.6	Operator headset [A, C: ref. a, ch. 2] [E: ref. a, ch. 5]	X		X		X	

209.3 PRINCIPLES OF OPERATION

209.3.1 How do the components work together to achieve the system's function? [ref. a, chs. 1, 2]

.2 Draw a diagram of this system. [ref. a, ch. 1]

209 DIVER UNDERWATER COLOR TELEVISION SYSTEM (CONT'D)

209.4 PARAMETERS/OPERATING LIMITS

209.4.1 What are the depth limits for the diver camera/light assembly/diver monitor? [ref. a, chs. 1, 2]

209.5 SYSTEM INTERFACE

209.5.1 How do the following outside influences affect the operation of this system: [refs. a, b]

a. Turbidity
b. Water current

.2 How does this system interface with the hydrodivers communication? [ref. a, ch. 4]

209.6 SAFETY PRECAUTIONS

209.6.1 What safety precautions must be observed when operating this system? [ref. a, chs. 1, 3]

300 INTRODUCTION TO WATCHSTATIONS

300.1 INTRODUCTION

The Watchstation section of your PQS is where you get a chance to demonstrate to your Qualifier that you can put the knowledge you have gained in the Fundamentals and Systems sections to use. This section allows you to practice the tasks required for your watchstation and to handle abnormal conditions and emergencies. Before starting your assigned tasks, you must complete the fundamentals and systems that pertain to the performance of that particular task. Satisfactory completion of all prerequisite watchstations, fundamentals and systems is required prior to achievement of final watchstation qualification.

300.2 FORMAT

Each watchstation in this section contains:

•A FINAL QUALIFICATION PAGE, which is used to obtain the required signatures for approval and recording of Final Qualification.

•A QUALIFICATION SUMMARY, which is used to record completion of all requirements for qualification at that watchstation, broken down as follows:

- PREREQUISITES, items that must be certified as having been completed before you can begin qualification for a particular watchstation. Prerequisites may include schools, watchstation qualifications from other PQS booklets and other watchstation qualifications from this booklet. Prior to signing off each prerequisite line item, the Qualifier must verify completion from existing records. The date is the date of actual completion, not the sign-off date. No points or percentages are assigned for prerequisites.

- FUNDAMENTALS, the required fundamentals from the 100 section of this PQS booklet and are in addition to fundamentals you may have completed for other watchstations. Normally all fundamentals must be completed and signed off here prior to starting the watchstation (section 300) tasks, however, the Qualifier has the option of allowing you to start selected watchstation tasks after completing the fundamentals pertaining to the performance of those particular tasks.

- SYSTEMS, from the 200 section of this PQS booklet which are required for this watchstation and are in addition to systems required for prerequisite watchstations. Before starting assigned watchstation (section 300) tasks, you must complete the systems that pertain to those particular tasks. Satisfactory completion of all systems listed is required for Final Qualification.

- WATCHSTATION Performance, which is the practical factors portion of your qualification. The performance is broken down as follows:

  Tasks (routine operating tasks that are performed frequently)
  Infrequent Tasks
  Abnormal Conditions
  Emergencies
  Training Watches

- A FINAL QUALIFICATION SECTION, which is used to obtain the required initials for approval and recording final qualification for each watchstation.

300.3 OPERATING PROCEDURES

The PQS deliberately makes no attempt to specify the procedures to be used to complete a task or to control or correct a casualty. The only proper sources of this information are the technical manuals, Engineering Operational Sequencing System (EOSS), Naval Air Training and Operating Procedures Standardization (NATOPS) or other policy-making documents prepared for a specific installation or a piece of equipment. Additionally, the level of accuracy required of a trainee may vary from school to school, ship to ship, and squadron to squadron based upon such factors as mission requirements. Thus, proficiency may be confirmed only through demonstrated performance at a level of competency sufficient to satisfy the Commanding Officer.

300.4 DISCUSSION ITEMS

Though actual performance of evolutions is always preferable to observation or discussion, some items listed in each watchstation may be too hazardous or time-consuming to perform or simulate. Therefore, you may be required to discuss such designated items with your Qualifier.

300.5 NUMBERING

Each Final Qualification is assigned both a watchstation number and a NAVEDTRA Final Qualification number. The NAVEDTRA number is to be used for recording qualifications in service and training records.

300.6 HOW TO COMPLETE

After completing the required fundamentals and systems applicable to a particular task, you may perform the task under the supervision of a qualified watchstander. If you satisfactorily perform the task and can explain each step, your Qualifier will sign you off for that task. After all line items have been completed, your Qualifier
will verify Final Qualification by signing and dating the Final Qualification pages.

301 DIVER'S LIFE SUPPORT SYSTEM (DLSS) OPERATOR

NAME_____RATE/RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified Diver's Life Support System (DLSS) Operator (NAVEDTRA 43245-C).

RECOMMENDED_____DATE_____
Supervisor

RECOMMENDED_____DATE_____
Division Officer

RECOMMENDED_____DATE_____
Department Head

QUALIFIED_____DATE_____
Commanding Officer or Designated Representative

SERVICE RECORD
ENTRY_____DATE_____

301 DIVER'S LIFE SUPPORT SYSTEM (DLSS) OPERATOR

Estimated completion time: 2 weeks Total points this watchstation: 100

301.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE ONE OF THE FOLLOWING:

301.1.1 SCHOOLS:

Diver, Second Class A-433-0022

Completed_____
(Qualifier and Date)

Basic Diving Officer A-4N-0024

Completed_____
(Qualifier and Date)

Explosive Ordnance Disposal Diver A-431-0083

Completed_____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Safety Precautions Fundamentals

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

102 Underwater Physiology and First Aid Fundamentals

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

105 Diving Symbols and Formulas Fundamentals

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

301.1.2 107 Divers' Life Support System (DLSS) Certification Fundamentals

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

110 Hyperbaric Chamber Fundamentals

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

112 Surface Supplied Diving System Fundamentals

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

113 Gas Mixing and Analysis Fundamentals

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

.3 SYSTEMS FROM THIS PQS:

206 Hyperbaric Chamber System

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

207 Diver's Life Support Mixed Gas/Air System

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

301.2 TASKS

For the tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters/operating limits must be monitored?
G. Perform this task IAW OPs.

		A	B	C	D	E	F	G
301.2.1	Draw and label all DLSS applicable to your command			X	X			X

_____
(Signature and Date)

.2	Compute systems capacities, limitations and compare to current PSOB			X	X		X	X

_____
(Signature and Date)

.3	Line up, operate and secure each diver's life support systems (DLSS)	X	X	X	X	X	X	X

_____
(Signature and Date)

.4	Start, operate and secure air compressor			X	X	X	X	X

_____
(Signature and Date)

.5	Compute all compressor efficiencies (LP and HP)			X	X	X	X	X

_____
(Signature and Date)

.6	Analyze gas (HeO_2) sample			X	X		X	X

_____
(Signature and Date)

		A	B	C	D	E	F	G
301.2.7	Start, operate and secure gas transfer equipment	X	X	X	X	X	X	X

_____
(Signature and Date)

COMPLETED .2 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

301.3 INFREQUENT TASKS

For the infrequent tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters must be monitored?
G. Perform or simulate this task IAW applicable OPs/SOPs/SORM.

		A	B	C	D	E	F	G
301.3.1	Obtain air sample	X	X	X	X	X	X	X

_____
(Signature and Date)

.2	Write a reentry control package	X	X	X

_____
(Signature and Date)

COMPLETED .3 AREA COMPRISES 8 PTS/8% OF WATCHSTATION.

301.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What emergencies or malfunctions may occur if immediate action is not taken?
F. How does this condition affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the corrective/immediate action for this abnormal condition IAW applicable EPs.

301.4.1 Malfunction of valves and controls

_____
(Signature and Date)

.2 Loss of electrical power

_____
(Signature and Date)

.3 Low lube oil pressure

_____
(Signature and Date)

.4 High temperature readings

_____
(Signature and Date)

.5 Excessive engine speed

_____
(Signature and Date)

301 DIVER'S LIFE SUPPORT SYSTEM (DLSS) OPERATOR (CONT'D)

301.4.6 Low output pressure

_____
(Signature and Date)

COMPLETED .4 AREA COMPRISES 5 PTS/5% OF WATCHSTATION.

301.5 EMERGENCIES

For the emergency conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What other emergencies or malfunctions may occur if immediate action is not taken?
F. How does this emergency affect other operations/ equipment/watchstations?
G. Perform or simulate the immediate action for this emergency condition IAW EPs.

301.5.1 Loss of primary breathing media (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.2 Contaminated breathing media (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.3 Ruptured hoses (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.4 Malfunction of reducers, valves and reliefs (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

301 DIVER'S LIFE SUPPORT SYSTEM (DLSS) OPERATOR (CONT'D)

301.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

301.6.1 Compressor Watch (3 times)

_____ _____ _____
(Signature and Date) (Signature and Date) (Signature and Date)

.2 Console Operator (3 times)

_____ _____ _____
(Signature and Date) (Signature and Date) (Signature and Date)

.3 Gas King Watch (3 times)

_____ _____ _____
(Signature and Date) (Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 30 PTS/30% OF WATCHSTATION.

301.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

301.7.1 EXAMINATIONS Pass a written examination

_____
(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

_____
(Signature & Date)

302 UNDERWATER BREATHING APPARATUS (UBA) OPERATOR

NAME_____RATE/RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified UNDERWATER BREATHING APPARATUS (UBA) OPERATOR (NAVEDTRA 43245-C).

RECOMMENDED_____DATE_____
Supervisor

RECOMMENDED_____DATE_____
Division Officer

RECOMMENDED_____DATE_____
Department Head

QUALIFIED_____DATE_____
Commanding Officer or Designated Representative

SERVICE RECORD
ENTRY_____DATE_____

302 UNDERWATER BREATHING APPARATUS (UBA) OPERATOR

Estimated completion time: 2 weeks Total points this watchstation: 100

302.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE ONE OF THE FOLLOWING:

302.1.1 SCHOOLS:

Diver, Second Class A-433-0022

Completed_____
(Qualifier and Date)

EOD Mixed Gas Diving UBA (for MK-16 only) A-431-0075

Completed_____
(Qualifier and Date)

Marine Corps Combatant Diver (for LAR V only) A-433-0052

Completed_____
(Qualifier and Date)

Basic Diving Officer A-4N-0024

Completed_____
(Qualifier and Date)

Explosive Ordnance Disposal Diver A-431-0083

Completed_____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Safety Precautions

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

302.1.2 102 Underwater Physiology and First Aid

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

103 Organization

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

105 Diving Symbols and Formulas

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

106 Diving Records and Reports

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

107 Divers' Life Support System (DLSS) Certification

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

111 Open Circuit Scuba

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

.3 SYSTEMS FROM THIS PQS:

201 Open Circuit Scuba

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

202 MK 20 MOD 0 Underwater Breathing Apparatus (UBA)

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

302.1.3 203 MK 21 MOD 1 Surface Supplied Diving Air/Mixed Gas

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

204 MK 16 MOD 0 Underwater Breathing Apparatus

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

205 Draeger LAR V UBA

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

302.2 TASKS

For the tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters/operating limits must be monitored?
G. Perform this task IAW applicable MRCs/SOPs/EPs/Manufacturer's Technical Manual.

302.2.1 Set up the following diving station applicable to your command (2 times)

a. MK 21 (air/gas) (2 times)

_____ _____
(Signature and Date) (Signature and Date)

b. MK 20 (2 times)

_____ _____
(Signature and Date) (Signature and Date)

302.2.1 c. Scuba (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.2 Perform predive, postdive and missions on the following diving equipment related to your command (2 times)

_____ _____
(Signature and Date) (Signature and Date)

a. MK 21 (air/gas) (2 times)

_____ _____
(Signature and Date) (Signature and Date)

b. MK 20 (2 times)

_____ _____
(Signature and Date) (Signature and Date)

c. Scuba (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .2 AREA COMPRISES 30 PTS/30% OF WATCHSTATION.

302.3 INFREQUENT TASKS

For the infrequent tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters must be monitored?
G. What conditions require this infrequent task?
H. Perform or simulate this task IAW applicable OPs/MRCs/SOPs/Dive Manuals, vols. 1 & 2

		A B C D E F G H
302.3.1	Repair/marry umbilical (2 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.2	Perform pre/post dive and missions on MK 16 (2 times)	X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.3	Perform pre/post dive and missions on LAR-V (2 times)	X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.4	Complete failure analysis report	X X X X X

_____
(Signature and Date)

COMPLETED .3 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

302.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What emergencies or malfunctions may occur if immediate action is not taken?
F. How does this condition affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the corrective/immediate action for this abnormal condition.

302.4.1 Equipment discrepancies during predive/postdive

_____
(Signature and Date)

COMPLETED .4 AREA COMPRISES 5 PTS/5% OF WATCHSTATION.

302.5 EMERGENCIES

For the emergency conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What other emergencies or malfunctions may occur if immediate action is not taken?
F. How does this emergency affect other operations/ equipment/watchstations?
G. Perform or simulate the immediate action for this emergency condition.

302.5.1 In water emergency procedure for:

a. MK 21 (2 times)

_____ _____
(Signature and Date) (Signature and Date)

302.5.1 b. MK 20 (2 times)

_____ _____
(Signature and Date) (Signature and Date)

c. SCUBA (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 19 PTS/19% OF WATCHSTATION.

302.6 WATCHES — None.

302.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

302.7.1 EXAMINATIONS Pass a written examination

_____
(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

_____
(Signature & Date)

303 DIVING SUPPORT EQUIPMENT OPERATOR

NAME_____RATE/RANK_____

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This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified DIVING SUPPORT EQUIPMENT OPERATOR (NAVEDTRA 43245-C).

RECOMMENDED_____DATE_____
Supervisor

RECOMMENDED_____DATE_____
Division Officer

RECOMMENDED_____DATE_____
Department Head

QUALIFIED_____DATE_____
Commanding Officer or Designated Representative

SERVICE RECORD
ENTRY_____DATE_____

303 DIVING SUPPORT EQUIPMENT OPERATOR

Estimated completion time: 2 weeks Total points this watchstation: 100

303.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE ONE OF THE FOLLOWING:

303.1.1 SCHOOLS:

Diver, Second Class A-433-0022

Completed_____
(Qualifier and Date)

Explosive Ordnance Disposal Diver A-431-0083

Completed_____
(Qualifier and Date)

Basic Diving Officer A-4N-0024

Completed_____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Safety Precautions

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

102 Underwater Physiology and First Aid

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

103 Organization

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

303.1.2 105 Diving Symbols and Formulas

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

106 Diving Records and Reports

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

112 Surface Supplied Diving System

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

113 Gas Mixing and Analysis

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

.3 SYSTEMS FROM THIS PQS:

208 Diving Water Heater

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

209 Diver Underwater Color Television

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

303 DIVING SUPPORT EQUIPMENT OPERATOR (CONT'D)

303.2 TASKS

For the tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What safety precautions must be observed?
E. What parameters/operating limits must be monitored?
F. Perform this task IAW MIP OPs/MRCs.

		A	B	C	D	E	F
303.2.1	Set up support equipment used by your command (2 times)	X	X	X	X		X

_____ _____
(Signature and Date) (Signature and Date)

.2	Operate support equipment used by your command (2 times)	X	X		X	X	X

_____ _____
(Signature and Date) (Signature and Date)

.3	Secure support equipment used by your command (2 times	X	X		X	X	X

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .2 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

303.3 INFREQUENT TASKS — None to be discussed.

303 DIVING SUPPORT EQUIPMENT OPERATOR (CONT'D)

303.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What emergencies or malfunctions may occur if immediate action is not taken?
F. How does this condition affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the corrective/immediate action for this abnormal condition.

		A	B	C	D	E	F	G	H
303.4.1	Equipment will not start (2 times)	X	X	X			X	X	X

_____ _____
(Signature and Date) (Signature and Date)

.2	Equipment fails during operation (2 times)	X	X	X	X	X	X	X	X

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .4 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

303.5 EMERGENCIES — None to be discussed.

303.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

303.6.1 Normal Operations Watch (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 15 PTS/15% OF WATCHSTATION.

303 DIVING SUPPORT EQUIPMENT OPERATOR (CONT'D)

303.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

303.7.1 EXAMINATIONS Pass a written examination

_____
(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

_____
(Signature & Date)

304 CHAMBER OPERATOR

NAME_____RATE/RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified CHAMBER OPERATOR (NAVEDTRA 43245-C).

RECOMMENDED_____DATE_____
Supervisor

RECOMMENDED_____DATE_____
Division Officer

RECOMMENDED_____DATE_____
Department Head

QUALIFIED_____DATE_____
Commanding Officer or Designated Representative

SERVICE RECORD
ENTRY_____DATE_____

304 CHAMBER OPERATOR

Estimated completion time: 2 weeks Total points this watchstation: 100

304.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE ONE OF THE FOLLOWING:

304.1.1 SCHOOLS:

Diver, Second Class A-433-0022

Completed_____
(Qualifier and Date)

Explosive Ordnance Disposal Diver A-431-0083

Completed_____
(Qualifier and Date)

Basic Diving Officer A-4N-0024

Completed_____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Safety Precautions

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

102 Underwater Physiology and First Aid

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

103 Organization

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

304.1.2 104 Planning Procedures

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

105 Diving Symbols and Formulas

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

106 Diving Records and Reports

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

107 Divers' Life Support System (DLSS) Certification

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

.3 SYSTEMS FROM THIS PQS:

206 Hyperbaric Chamber

Completed_____ 6 pts/6% of Watchstation
(Qualifier and Date)

207 Diver's Life Support Mixed Gas/Air

Completed_____ 6 pts/6% of Watchstation
(Qualifier and Date)

304 CHAMBER OPERATOR (CONT'D)

304.2 TASKS

For the tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters/operating limits must be monitored?
G. Perform during actual/simulated treatment or pressure test.
H. Perform this task IAW OPs/EPs/MRCs.

		A B C D E F G H
304.2.1	Draw and label all chamber systems applicable to your command	X X X X X X X

_____
(Signature and Date)

.2	Compute system capabilities and limitations and compare with current PSOB	X X X X X X X

_____
(Signature and Date)

.3	Line up Chamber/Oxygen System (3 times)	X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.4	Operate Chamber/Oxygen System (3 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

		A B C D E F G H
304.2.5	Operate outer/medical lock	X X X X X X X

_____
(Signature and Date)

.6	Secure Chamber System (3 times)	X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

COMPLETED .2 AREA COMPRISES 25 PTS/25% OF WATCHSTATION.

304.3 INFREQUENT TASKS

For the infrequent tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What safety precautions must be observed?
E. What parameters must be monitored?
F. What conditions require this infrequent task?
G. Perform or simulate this task IAW applicable OPs/U.S. Navy Diving Manual.

304.3.1 Perform air pressure and leak test on chamber

_____
(Signature and Date)

COMPLETED .3 AREA COMPRISES 12 PTS/12% OF WATCHSTATION.

304.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What emergencies or malfunctions may occur if immediate action is not taken?
F. How does this condition affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the corrective/immediate action for this abnormal condition IAW OPs/EPs.

304.4.1 Increase of depth (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.2 Decrease of depth (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.3 Increase of temperature (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.4 High CO_2 (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.5 High O_2 (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .4 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

304.5 EMERGENCIES

For the emergency conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What other emergencies or malfunctions may occur if immediate action is not taken?
F. How does this emergency affect other operations/ equipment/watchstations?
G. Perform or simulate the immediate action for this emergency condition IAW EPs.

304.5.1 Loss of primary air supplies (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.2 Fire in chamber (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.3 Loss of electrical power (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.4 Rapid increase/decrease of chamber pressure (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

304.6 WATCHES — None.

304 CHAMBER OPERATOR (CONT'D)

304.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

304.7.1 EXAMINATIONS Pass a written examination

_____
(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

_____
(Signature & Date)

305 INSIDE TENDER

NAME_____RATE/RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified Inside Tender (NAVEDTRA 43245-C).

RECOMMENDED_____DATE_____
Supervisor

RECOMMENDED_____DATE_____
Division Officer

RECOMMENDED_____DATE_____
Department Head

QUALIFIED_____DATE_____
Commanding Officer or Designated Representative

SERVICE RECORD
ENTRY_____DATE_____

305 INSIDE TENDER

Estimated completion time: 2 weeks Total points this watchstation: 100

305.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE ONE OF THE FOLLOWING:

305.1.1 SCHOOLS:

Diver, Second Class A-433-0022

Completed_____
(Qualifier and Date)

Explosive Ordnance Disposal Diver A-431-0083

Completed_____
(Qualifier and Date)

Basic Diving Officer A-4N-0024

Completed_____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Safety Precautions

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

102 Underwater Physiology and First Aid

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

103 Organization

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

305 INSIDE TENDER (CONT'D)

305.1.2 108 Air Diving Decompression Tables

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

109 Treatment Tables

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

110 Hyperbaric Chamber

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

114 Surface Supplied Helium Oxygen Decompression

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

.3 SYSTEMS FROM THIS PQS:

206 Hyperbaric Chamber

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

207 Diver's Life Support Mixed Gas/Air

Completed_____ 5 pts/5% of Watchstation
(Qualifier and Date)

305.2 TASKS

For the tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What safety precautions must be observed?
D. Perform this task IAW applicable OPs/MRCs/SOPs.

305.2.1 Perform neurological examination (3 times)

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

305.2.2 Recognize and diagnose O_2 toxicity (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.3 Recognize and diagnose pulmonary O_2 toxicity (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.4 Introduce intravenous catheter (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.5 Check vital signs at treatment depth (pulse, breath and temperature) (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .2 AREA COMPRISES 15 PTS/15% OF WATCHSTATION.

305.3 INFREQUENT TASKS — None to be discussed.

305.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What emergencies or malfunctions may occur if immediate action is not taken?
F. How does this condition affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the corrective/immediate action for this abnormal condition IAW EP/U.S. Navy Diving Manual.

	A	B	C	D	E	F	G	H
305.4.1 Barotrauma (2 times)	X	X				X		X

_____ _____

(Signature and Date) (Signature and Date)

		A B C D E F G H
305.4.2	Tension pneumothorax (2 times)	X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.3	Recognizing of worsening of symptoms (2 times)	X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.4	Recompression chamber ambient high/low temperatures (2 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .4 AREA COMPRISES 15 PTS/15% OF WATCHSTATION.

305.5 EMERGENCIES

For the emergency conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What other emergencies or malfunctions may occur if immediate action is not taken?
E. How does this emergency affect other operations/ equipment/watchstations?
F. Perform or simulate the immediate action for this emergency condition. IAW applicable OPs/EPs.

		A B C D E F
305.5.1	Cardiac arrest (2 times)	X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.2	Convulsions/seizures (2 times)	X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

		A B C D E F
305.5.3	Loss of electrical power (2 times)	X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.4	Urinary retention	X X X X X

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .5 AREA COMPRISES 15 PTS/15% OF WATCHSTATION.

305.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

305.6.1 Normal Operations Watch (3 times)

_____ _____ _____
(Signature and Date) (Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

305.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

305.7.1 EXAMINATIONS Pass a written examination

_____
(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

_____
(Signature & Date)

306 CHAMBER SUPERVISOR

NAME_____RATE/RANK_____

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This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified CHAMBER SUPERVISOR (NAVEDTRA 43245-C).

RECOMMENDED_____DATE_____
Supervisor

RECOMMENDED_____DATE_____
Division Officer

RECOMMENDED_____DATE_____
Department Head

QUALIFIED_____DATE_____
Commanding Officer or Designated Representative

SERVICE RECORD
ENTRY_____DATE_____

306 CHAMBER SUPERVISOR

Estimated completion time: 2 weeks Total points this watchstation: 100

306.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE ONE OF THE FOLLOWING:

306.1.1 SCHOOLS:

Diver, Second Class A-433-0022

Completed_____
(Qualifier and Date)

Explosive Ordnance Disposal Diver A-431-0083

Completed_____
(Qualifier and Date)

Basic Diving Officer A-4N-0024

Completed_____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Safety Precautions

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

102 Underwater Physiology and First Aid

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

103 Organization

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

306 CHAMBER SUPERVISOR (CONT'D)

306.1.2 104 Planning Procedures

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

105 Diving Symbols and Formulas

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

106 Diving Records and Reports

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

107 Divers' Life Support System (DLSS) Certification

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

108 Air Diving Decompression Tables

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

109 Treatment Tables

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

110 Hyperbaric Chamber

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

114 Surface Supplied Helium Oxygen Decompression

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

306.1.3 SYSTEMS FROM THIS PQS:

206 Hyperbaric Chamber

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

207 Diver's Life Support Mixed Gas/Air

Completed_____ 4 pts/4% of Watchstation
(Qualifier and Date)

306.2 TASKS

For the tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters/operating limits must be monitored?
G. Perform this task.

		A	B	C	D	E	F	G
306.2.1	Recognize and diagnose casualties requiring chamber treatment (3 times)	X	X	X	X	X	X	X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.2	Select appropriate treatment table (3 times)	X	X	X	X		X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

		A B C D E F G
306.2.3	Coordinate and supervise team operation of hyperbaric chamber during chamber operations (3 times)	X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.4	Perform lock in/lock out procedures	X X X X X X X

_____
(Signature and Date)

.5	Supervise inside tender O_2 breathing protocol procedures	X X X X X X X

_____
(Signature and Date)

COMPLETED .2 AREA COMPRISES 8 PTS/8% OF WATCHSTATION.

306.3 INFREQUENT TASKS

For the infrequent tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters must be monitored?
G. How are monitored parameters changed by this infrequent task?
H. What conditions require this infrequent task?
I. Perform or simulate this task IAW applicable OPs/U.S. Navy Diving Manual.

306.3.1 Perform Hyperbaric Oxygen (HBO) therapy

_____
(Signature and Date)

306.3.2 Perform Advanced Cardiac Life Support (ACLS)

_____
(Signature and Date)

COMPLETED .3 AREA COMPRISES 5 PTS/5% OF WATCHSTATION.

306.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What emergencies or malfunctions may occur if immediate action is not taken?
F. How does this condition affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the corrective/immediate action for this abnormal condition IAW EPs.

		A B C D E F G H
306.4.1	Central nervous system oxygen toxicity (3 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.2	Pulmonary oxygen toxicity (3 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.3	Loss of treatment gas (3 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

A B C D E F G H

306.4.3

_____
(Signature and Date)

.4 Recurrence of symptoms (3 times) X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.5 Abort procedures X X X X X X

_____
(Signature and Date)

.6 Tension pneumothorax X X X X X X X X

_____
(Signature and Date)

COMPLETED .4 AREA COMPRISES 5 PTS/5% OF WATCHSTATION.

306.5 EMERGENCIES

For the emergency conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What other emergencies or malfunctions may occur if immediate action is not taken?
F. How does this emergency affect other operations/ equipment/watchstations?
G. Perform or simulate the immediate action for this emergency condition IAW EPs.

306.5.1 Fire

_____
(Signature and Date)

306.5.2 Failure of systems

_____
(Signature and Date)

.3 Patient's condition deteriorating

_____
(Signature and Date)

COMPLETED .5 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

306.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

306.6.1 Supervisor Chamber Operators Watch (3 times)

_____ _____ _____
(Signature and Date) (Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 20 PTS/20% OF WATCHSTATION.

306.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

306.7.1 EXAMINATIONS Pass a written examination

_____
(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

_____
(Signature & Date)

307 DIVING SUPERVISOR

NAME_____RATE/RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified DIVING SUPERVISOR (NAVEDTRA 43245-C).

RECOMMENDED_____DATE_____
Supervisor

RECOMMENDED_____DATE_____
Division Officer

RECOMMENDED_____DATE_____
Department Head

QUALIFIED_____DATE_____
Commanding Officer or Designated Representative

SERVICE RECORD
ENTRY_____DATE_____

307 DIVING SUPERVISOR

Estimated completion time: 2 weeks Total points this watchstation: 100

307.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, COMPLETE ONE OF THE FOLLOWING:

307.1.1 SCHOOLS:

Diver, Second Class A-433-0022

Completed_____
(Qualifier and Date)

Basic Diving Officer A-4N-0024

Completed_____
(Qualifier and Date)

Explosive Ordnance Disposal Diver A-431-0083

Completed_____
(Qualifier and Date)

.2 WATCHSTATIONS FROM THIS PQS:

301 Diver's Life Support System Operator

Completed_____
(Qualifier and Date)

302 Underwater Breathing Apparatus Operator

Completed_____
(Qualifier and Date)

303 Diving Support Equipment Operator

Completed_____
(Qualifier and Date)

304 Chamber Operator

Completed_____
(Qualifier and Date)

307.1.2 305 Inside Tender

Completed_____
(Qualifier and Date)

306 Chamber Supervisor

Completed_____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.3 FUNDAMENTALS FROM THIS PQS:

101 Safety Precautions

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

102 Underwater Physiology and First Aid

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

103 Organization

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

104 Planning Procedures

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

105 Diving Symbols and Formulas

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

106 Diving Records and Reports

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

307.1.3 107 Divers' Life Support System (DLSS) Certification

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

108 Air Diving Decompression Tables

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

109 Treatment Tables

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

110 Hyperbaric Chamber

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

111 Open Circuit Scuba

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

112 Surface Supplied Diving System

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

113 Gas Mixing and Analysis

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

114 Surface Supplied Helium Oxygen Decompression

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

307.1.4 SYSTEMS FROM THIS PQS:

201 Open Circuit Scuba

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

202 MK 20 MOD 0 Under Water Breathing Apparatus (UBA)

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

203 MK 21 MOD 1 Surface Supplied Diving Air/Mixed Gas

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

204 MK 16 MOD 0 Underwater Breathing Apparatus

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

205 Draeger LAR V UBA

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

206 Hyperbaric Chamber

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

207 Diver's Life Support Mixed Gas/Air

Completed_____ 2 pts/2% of Watchstation
(Qualifier and Date)

307.2 TASKS

For the tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters/operating limits must be monitored?
G. Perform this task IAW U.S. Navy Diving Manuals (Vols. 1 & 2)

		A	B	C	D	E	F	G
307.2.1	Plan diving operation (3 times)	X	X	X	X	X	X	X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.2	Monitor pre and post dive evolution for commands diving equipment and systems (3 times)	X	X	X		X	X	X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.3	Brief divers and topside personnel (3 times)	X	X	X	X	X	X	X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.4	Supervise scuba dive (3 times)	X	X	X	X	X	X	X

_____ _____
(Signature and Date) (Signature and Date)

		A	B	C	D	E	F	G
307.2.4								
	_____ (Signature and Date)							
.5	Supervise surface supplied air dive (2 times)	X	X	X	X	X	X	X
	_____ _____ (Signature and Date) (Signature and Date)							
.6	Supervise surface decompression dive (2 times)	X	X	X	X	X	X	X
	_____ _____ (Signature and Date) (Signature and Date)							
.7	Supervise mixed gas dive (2 times)	X	X	X	X	X	X	X
	_____ _____ (Signature and Date) (Signature and Date)							
.8	Debrief divers and topside personnel (3 times)	X	X	X				X
	_____ _____ (Signature and Date) (Signature and Date)							
	_____ (Signature and Date)							
.9	Recognize and diagnose diving related illnesses (3 times)	X	X	X		X	X	X
	_____ _____ (Signature and Date) (Signature and Date)							
	_____ (Signature and Date)							
.10	Perform neurological examination (3 times)	X	X	X		X	X	X
	_____ _____ (Signature and Date) (Signature and Date)							
	_____ (Signature and Date)							

		A	B	C	D	E	F	G
307.2.11	Record keeping (2 times)			X	X			X

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .2 AREA COMPRISES 10 PTS/10% OF WATCHSTATION.

307.3 INFREQUENT TASKS

For the infrequent tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What means of communications are used?
E. What safety precautions must be observed?
F. What parameters must be monitored?
G. What conditions require this infrequent task?
H. Perform or simulate this task IAW applicable OPs/MRCs/SOPs/SORM/Diving Manual.

307.3.1 Supervise LAR V dive (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.2 Supervise MK 16 dive (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.3 Supervise SDV operational dives (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.4 Supervise ice dive

_____
(Signature and Date)

307.3.5 Supervise altitude dive

_____
(Signature and Date)

COMPLETED .3 AREA COMPRISES 18 PTS/18% OF WATCHSTATION.

307.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What emergencies or malfunctions may occur if immediate action is not taken?
F. How does this condition affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the corrective/immediate action for this abnormal condition IAW U.S. Navy Diving Manuals (Vols. 1 & 2)

		A B C D E F G H
307.4.1	Variations in rates of descent/ascent (3 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.2	Barotrauma during ascent and descent (2 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.3	Omitted decompression procedures (2 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

		A B C D E F G H
307.4.4	Loss of primary air/gas (2 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.5	Loss of communications (2 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

.6	Changes in the surrounding environment (i.e., sea state, wind, current, temperature, waterborne traffic) (3 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.7	Unanticipated changes in ship's status (3 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.8	Unanticipated changes in diving plan (3 times)	X X X X X X X X

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

COMPLETED .4 AREA COMPRISES 15 PTS/15% OF WATCHSTATION.

307.5 EMERGENCIES

For the emergency conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What other emergencies or malfunctions may occur if immediate action is not taken?
F. How does this emergency affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the immediate action for this emergency condition IAW U.S. Navy Diving Manual(V1)/EPs.

307.5.1 Blowup (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.2 Loss of all communications (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.3 Contaminated air (3 times)

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.4 Contaminated gas supply (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.5 Near drowning (3 times)

_____ _____
(Signature and Date) (Signature and Date)

307.5.5

_____
(Signature and Date)

.6 Trapped diver (3 times)

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.7 Lost diver (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.8 Unconscious diver on bottom (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.9 Traumatic injuries (3 times)

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.10 Disorder due to breathing gases (3 times)

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

COMPLETED .5 AREA COMPRISES 15 PTS/15% OF WATCHSTATION.

307.6 WATCHES — None.

307.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

307.7.1 EXAMINATIONS Pass a written examination

_____
(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

_____
(Signature & Date)

308 DIVING OFFICER

NAME_____RATE/RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

This qualification section is to be maintained by the trainee and updated to ensure awareness of remaining tasks.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified DIVING OFFICER (NAVEDTRA 43245-C).

RECOMMENDED_____DATE_____
Supervisor

RECOMMENDED_____DATE_____
Division Officer

RECOMMENDED_____DATE_____
Department Head

QUALIFIED_____DATE_____
Commanding Officer or Designated Representative

SERVICE RECORD
ENTRY_____DATE_____

308 DIVING OFFICER

Estimated completion time: 2 weeks Total points this watchstation: 100

308.1 PREREQUISITES

BEFORE STARTING YOUR ASSIGNED TASKS, YOU MUST BE A COMMISSIONED OFFICER AND HAVE COMPLETED ONE THE FOLLOWING:

308.1.1 SCHOOLS:

Basic Diving Officer A-4N-0024

Completed_____
(Qualifier and Date)

Diver, First Class A-433-0025

Completed_____
(Qualifier and Date)

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING PQS ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT MUST BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

.2 FUNDAMENTALS FROM THIS PQS:

101 Safety Precautions

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

102 Underwater Physiology and First Aid

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

103 Organization

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

104 Planning Procedures

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

308.1.2 105 Diving Symbols and Formulas

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

106 Diving Records and Reports

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

107 Divers' Life Support System (DLSS) Certification

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

108 Air Diving Decompression Tables

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

109 Treatment Tables

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

110 Hyperbaric Chamber

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

111 Open Circuit Scuba

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

112 Surface Supplied Diving System

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

113 Gas Mixing and Analysis

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

308.1.2 114 Surface Supplied Helium Oxygen Decompression

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

115 MK 16 MOD O Closed Circuit Mixed Gas UBA

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

116 Draeger LAR V UBA

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

.3 SYSTEMS FROM THIS PQS:

201 Open Circuit Scuba

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

202 MK 20 MOD 0 Underwater Breathing Apparatus (UBA)

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

203 MK 21 MOD 1 Surface Supplied Diving Air/Mixed Gas

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

204 MK 16 MOD 0 Underwater Breathing Apparatus

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

205 Draeger LAR V UBA

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

308.1.3 206 Hyperbaric Chamber

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

207 Diver's Life Support Mixed Gas/Air

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

208 Diving Water Heater

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

209 Diver Underwater Color Television

Completed_____ 3 pts/3% of Watchstation
(Qualifier and Date)

308.2 TASKS

For the tasks listed below:

A. What are the steps of this procedure?
B. What are the reasons for each step?
C. What control/coordination is required?
D. What safety precautions must be observed?
E. What parameters/operating limits must be monitored?
F. Perform this task IAW U.S. Navy Diving Manuals (Vols. 1 & 2)

308.2.1 Monitor diver training and verify diver qualifications (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.2 Monitor DLSS certification IAW current instruction (2 times)

_____ _____
(Signature and Date) (Signature and Date)

308.2.3 Successfully plan, organize and implement comprehensive and safe diving evolutions with respect to the command's capabilities and mission (3 times)

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

.4 Participate in diving casualty drill (2 times)

_____ _____
(Signature and Date) (Signature and Date)

.5 Manage incident/accident/equipment investigation's report (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .2 AREA COMPRISES 9 PTS/9% OF WATCHSTATION.

308.3 INFREQUENT TASKS — None to be discussed.

308.4 ABNORMAL CONDITIONS

For the abnormal conditions listed below:

A. What indications and alarms are received?
B. What immediate action is required?
C. What are the probable causes?
D. What operating limitations are imposed?
E. What emergencies or malfunctions may occur if immediate action is not taken?
F. How does this condition affect other operations/ equipment/watchstations?
G. What follow-up action is required?
H. Perform or simulate the corrective/immediate action for this abnormal condition IAW U.S. Navy Diving Manuals (Vols. 1 & 2)

308.4.1 Unanticipated changes in diving plan (3 times)

_____ _____
(Signature and Date) (Signature and Date)

_____
(Signature and Date)

COMPLETED .4 AREA COMPRISES 7 PTS/7% OF WATCHSTATION.

308 DIVING OFFICER (CONT'D)

308.5 EMERGENCIES — None to be discussed.

308.6 WATCHES

STAND THE FOLLOWING WATCHES UNDER QUALIFIED SUPERVISION:

308.6.1 Perform duties as Diving Officer during a scuba dive

_____
(Signature and Date)

.2 Perform duties as Diving Officer during a surface supplied air dive (2 times)

_____ _____
(Signature and Date) (Signature and Date)

COMPLETED .6 AREA COMPRISES 9 PTS/9% OF WATCHSTATION.

308.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

308.7.1 EXAMINATIONS Pass a written examination

_____
(Signature & Date)

.2 EXAMINATIONS Pass an oral examination board

_____
(Signature & Date)

FINAL QUALIFICATION SECTION FOR
NAVY DIVER

NAME_____RATE/RANK_____

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	WORK CENTER SUPERVISOR	DIVISION OFFICER	DEPARTMENT HEAD	CO or DESIG REP	PAGE 4 ENTRY
301 DIVER'S LIFE SUPPORT SYSTEM (DLSS) OPERATOR					
INITIALS					
DATE					
302 UNDERWATER BREATHING APPARATUS (UBA) OPERATOR					
INITIALS					
DATE					
303 DIVING SUPPORT EQUIPMENT OPERATOR					
INITIALS					
DATE					
304 CHAMBER OPERATOR					
INITIALS					
DATE					

FINAL QUALIFICATION SECTION FOR NAVY DIVER (CONT'D)

	WORK CENTER SUPERVISOR	DIVISION OFFICER	DEPARTMENT HEAD	CO or DESIG REP	PAGE 4 ENTRY
305 INSIDE TENDER					
INITIALS	_____	_____	_____	_____	_____
DATE	_____	_____	_____	_____	_____
306 CHAMBER SUPERVISOR					
INITIALS	_____	_____	_____	_____	_____
DATE	_____	_____	_____	_____	_____
307 DIVING SUPERVISOR					
INITIALS	_____	_____	_____	_____	_____
DATE	_____	_____	_____	_____	_____
308 DIVING OFFICER					
INITIALS	_____	_____	_____	_____	_____
DATE	_____	_____	_____	_____	_____

110040/S-Tron Ducts Operating and Maintenance
Command Generated System OPs and EPs
Manufacturer's Technical Manual
Naval Diving and Salvage Training Center Formula Worksheet
NAVSEA 0994-LP-001-9010, U.S. Navy Diving Manual; Vol. 1, Air Diving
NAVSEA 0994-LP-001-9020, U.S. Navy Diving Manual; Vol. 2, Mixed-Gas Diving
NAVSEA S6560-AG-OMP-010, Underwater Breathing Apparatus, MK 21 MOD 1
NAVSEA S9086-TX-STM-010, Naval Ships' Technical Manual, ch. 583, Boats and Small Craft
NAVSEA SS521-AA-MAN-010, U.S. Navy Diving and Manned Hyperbaric Systems Safety Certification Manual
NAVSEA SS600-AH-MMA-010, Underwater Breathing Apparatus, MK 16 MOD 0
NAVSEA SS600-AJ-MMO-010, Underwater Breathing Apparatus LAR V
NAVSEA SS600-AK-MMO-010, Breathing Apparatus, Underwater (UBA), MK 20 MOD 0
NAVSEA SS521-AA-MAN-010, U.S. Navy Diving and Manned Hyperbaric Systems Safety Certification Manual
NAVSEA SS600-AJ-MMO-010, Underwater Breathing Apparatus LAR V
OPNAVINST 3120.32B, Standard Organization and Regulations of the U.S. Navy (SORM)
Ship's Standard Organization and Regulations Manual (SORM)
Subject Matter Experts (SME's)
System Emergency Procedures (EP's)

Personnel Qualifications Standard
Feedback Report

From_____Date_____

Via_____Date_____
Department Head

Activity_____

Mailing
Address_____

_____DSN_____

PQS
Title_____NAVEDTRA_____

Section
Affected_____

Page
Number(s)_____

Remarks/Recommendations (Use additional sheets if necessary):

(FOLD HERE)

DEPARTMENT OF THE NAVY

OFFICIAL BUSINESS

COMMANDING OFFICER
NETPMSA CODE 034
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32509-5234

(FOLD HERE)